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jbr CONSULTANTS GROUP

GEOLOGY ENGINEERING ENVIRONMENT HYDROLOGY

May 19, 1992

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MAY 22 1992
DIVISION OF
OIL GAS & MINING

D. Wayne Hedburg
Division of Oil, Gas and Mining
355 West North Temple
3 Triad Center, Suite, Suite 350
Salt Lake City, Utah 84180

RE: Re-evaluation of Low-Flow Crossings in Haul Road for Tenneco Minerals Company, Goldstrike Mine, M/053/005, Washington County, Utah

Dear Wayne:

Tenneco Minerals Company (TMC) has asked JBR Consultants Group to reassess the placement of "low-flow crossings" in lieu of culverts at the various channel crossings in the proposed haul road to be constructed as part of the Goldsil expansion. In the revised Notice of Intention (NOI) submitted by TMC to the Division on January 22, 1992, "low-flow crossings" were proposed to be placed at ten locations where stream channels would intersect the proposed haul road. However, the Division, in its March 9, 1992 letter to TMC, indicated that these crossings would not be appropriate for channels which were estimated to convey a peak flow of greater than 100 cfs during the 100-year, 24-hour design storm event. This would mean that four out of the ten crossings would need culvert installation rather than the proposed low-flow crossing.

The low flow crossings were originally proposed for three reasons: (1) they would allow flows to cross the road without impoundment; (2) they would remain in place after reclamation; and (3) problems associated with culvert blockage and maintenance would be eliminated. Construction of these crossings would entail placement of fill at a one-half percent slope above the road crossing until the fill intersects the natural channel. Fill downstream of the road surface would be placed at a 3:1 slope to the natural channel bottom. A riprapped channel would be constructed in this road outslope to provide erosion protection. Additional riprap protection would be used at critical transition locations as well. Because these structures would be left in place after reclamation, they were designed to pass the runoff from the 100-year, 24-hour precipitation event.

Examination of the hydraulics associated with all of the ten originally proposed crossings shows that functioning would be similar in all cases and as follows: Flow from the upstream, natural channel would enter the placed fill at relatively high velocity and under supercritical conditions during the design flow. Because of the low gradient of the fill, flow in this reach would become subcritical, and an hydraulic jump would occur near the

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transition. Flow would next spill over the roadway surface to the 3:1 roadfill outslope, and passing critical depth, would again become supercritical. As the fill slope toes out into the natural channel, flows would remain supercritical, although velocities would decrease.

For eight of these crossings (1U, 2A, 2B, 3A, 3B, 3C, 4A, and 4B), hydraulic parameters of Froude number, normal depth, normal velocity and jump height would be very similar. Froude number would range between 0.6 and 0.7 on the flatter fill reach and between 3.0 and 3.3 for the steeper fill reach. Velocities would not exceed allowable velocity of a natural fine-grained material on the flatter reach, and flow depths in all reaches would be less than 1.5 feet. Jump height for these eight crossing would be less than 0.5 feet, so wave height would be minimal.

In contrast, the remaining two crossings (1T and 5A) would have substantially different Froude numbers associated with the design event, as well as significantly increased velocities.

Therefore, based upon the hydraulic analyses of the low flow crossings, JBR feels that the originally proposed locations can be divided into two groups regarding potential for failure during the design event. Given the assessment, we have recommended to TMC that the designs for the latter group (crossings 1T and 5A) be revised to replace the planned low flow crossings with culverts.

However, we feel that the remaining eight crossings would function adequately and hydraulically almost identically to each other during the design event and should be allowed as an experimental practice. Two of the channels (2B and 4A) within this group have a design peak of greater than 100 cfs (117 and 113 cfs, respectively), which was the Division's cut-off for allowing the crossings. We would like the Division to reassess the cut-off based upon the additional information on the crossings that TMC has submitted in the response to comments on the revised NOI dated April 7 and based upon this letter.

Thank you for your consideration of this matter in behalf of TMC. Please feel free to call if we can be of help in your assessment.

Sincerely,

Karla Knoop by DWH

Karla Knoop
Hydrologist

cc: K. Kluksdahl/Tenneco
E. Lips/JBR

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May 19, 1992

Mr. D. Wayne Hedberg
Division of Oil, Gas and Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180

RE: Final Approval, Permit Amendment, Covington Pit & Haul Road Development, Tenneco Minerals Company, Goldstrike Mine, M/053/005, Washington County, Utah

Dear Wayne:

Tenneco has reviewed your letter dated April 28, 1992 regarding final approval of the permit amendment. We offer the following clarifications to your responses.

R647-4-107.2 & .3 Operational Practices (Drainages & Erosion Control) - DWH

Tenneco agrees to install trash racks at the inlets of the culverts designed to pass the runoff from the 10-year, 24-hour precipitation event. Should culverts be installed that are designed to pass the runoff from the 100-year, 24-hour event, these trash racks would not be installed.

Tenneco is pursuing the option of leaving the haul road as a permanent replacement for the lower existing section of the East Fork Beaver Dam Wash mine access/public road. We have discussed this matter with the BLM and have their agreement that this would be a desirable option. However, there are remaining issues to be resolved with both the BLM and the County before an agreement is reached. We appreciate the Division's support for this and will continue to pursue the possibility.

Tenneco concurs with the Division's recommendation that silt fences not exceed 3 feet in height, and will thus limit their construction accordingly. At the Divisions request, Tenneco will also construct small overflow keyways cut into the top center portion of the fences.

R647-4-111.2 Reclamation Practices, Natural Stream Channels - DWH

As stated above, Tenneco is in the process of resolving outstanding issues related to the conveyance of the haul road to the County or BLM following mining operations at Goldstrike. The issue of maintenance is one of those that remains to

be resolved. We will keep the Division informed as agreements are reached to insure that your concerns over the question of surety are addressed. In the event that the road is not kept open and is reclaimed by Tenneco, the low-flow crossings would remain in there as-built configurations with little or no modification due to the fact that they would be originally constructed to pass the runoff from the 100-year, 24-hour precipitation event.

Tenneco acknowledges the Division's possible adjustment to the surety calculations to reflect anticipated costs under the "worst-case" scenario for removal of the low-flow crossings on public lands. Tenneco believes that the $2,000,000 reclamation surety will adequately cover any adjustments for this reclamation work.

R647-4-111.3 Reclamation Practices, Erosion/Sediment Control - HWS

Tenneco acknowledges the Division's comments and have revised the plan accordingly to clarify these issues. Please insert the attached pages 71 and 71A in your Revised NOIs.

R647-4-113 Surety - AAG

The discrepancy between the acres to be reclaimed (323) and those disturbed but not reclaimed (334) represents the 11 acres reclaimed to date in the Peak Area. We apologize for the confusion on this.

If you have any questions, feel free to contact me.

Sincerely,

Ken A. Kluksdahl by gwj

Ken A. Kluksdahl
Mine Manager

Enclosure

cc: E. Lips/JBR

None of the pits would not impound any water because they would be backfilled to the point where surface runoff would drain away from them.

The Goldtown Pit would be completely backfilled with waste material removed from the Basin Pit. Any surface disturbance associated with this pit would be reclaimed with the surrounding contractors staging area.

Haul Road

Approximately 6,000 linear feet of the main Goldsil haul road would be regraded to approximate original contours. In addition, fill material and culverts would be removed from drainages 1T, 2B, 4A, and 5A.

6.5 Drainage and Sediment Control

Upon reclamation, all ditches and the Quail Canyon Dam spillway and channel would be left in place. Accordingly, they have been designed to pass the peak flow from the 100-year 24-hr storm event. Culvert # 4 would be left in place and would be maintained by the BLM. The remaining culverts would be removed during regrading activities. Reclaimed roads would have water bars installed according to the following specifications:

Road Grade (percent)	Space (feet)
10 to 14	100 to 200
6 to 10	200 to 300
4 to 6	300 to 400
less than 4	as needed

Surface runoff from the reclaimed site would be no greater than runoff from the mine site during operation. In fact, runoff and sediment transport should decrease once vegetation has been established. All silt fences and other sediment control structures would be left until ultimate surety release to control potential storm silting events after reclamation.

The sediment dam would remain intact after reclamation is completed even though it would not impound water. This structure would be reclaimed using the same techniques as the rest of the mining site.

Most drainages affected by mining operations would be re-established through the area of disturbance. Culverts and road fill material in drainages 1T, 2B, 4A, and 5A would be removed and the channels would be re-established in their approximate pre-mining hydrologic configuration. Where low-flow crossings are constructed, the channels would be re-established across the roads. Drainages affected by pits would continue to be

permanently rerouted. All road ditches would be covered up by regrading upon reclamation and would no longer be functional.

6.6 Topsoil Plan

Prior to mining, topsoil has been, and would be stripped from the proposed area of disturbance.